AGS STUDIES REPORT NUMBER 100

Date 10/14/77 Time 1200-1400 Experimenters J.W. Glenn and H. Weisberg

Subject Extraction Efficiency

OBSERVATIONS AND CONCLUSION

Objective: To repeat the SEC and extraction loss monitor calibration described in AGS Tech. Note #133 and measure the present extraction efficiency.

Procedure: Before the measurements, the electronics gains, high voltage settings and gas flows for the various loss monitors were checked and recorded, and at least one fault was repaired. A procedure is being devised for repeating this checkout in a routine way in the future.

Results: (1) Horizontal scanning of the beam across the C12 SEC showed no more than 1% efficiency variation across the beam spot. This unit uses single foils and mesh H.V. planes (the gold foil was being read out) and has received a cumulative dose of 6×10^{18} protons.

(2) Calibration of the SEC efficiency by the ring loss monitor method gives an efficiency of 910 counts/10^{12} protons, in disagreement with the result from foil calibration of 1000 counts/10^{12} protons.

(3) Loss monitor responses in counts per 10^{12} protons were found to be as follows:

Parameter Varied	RLM	F10LM	F5LM
Sextupole current	550		
F10 radius	550	90	
F5 skew	550	40	65

The RLM calibration is similar to that obtained previously but the other two are 30% lower, for unknown reasons.

(4) Using these calibration factors we obtain the following losses and efficiencies for current operating conditions:

F5 loss	16%
F10 loss	0%
Ring loss	16%
Extraction efficiency (by loss monitor method)	84%
Extraction efficiency (by foil calibration)	76%

These measurements indicate that the extraction efficiency is ~6% worse than in the May-June SEB run, and that all the loss is at F5.

Recommendations: (1) The procedure to check the loss monitor electronics and gas flows should be carried out before each SEB run.

(2) After cooldown the F5 septum straightness should be measured.